

TO: Paul Wagner, Chairperson
Fish Passage Advisory Committee

FROM: James Adams, US Army Corps of Engineers
Tony Norris, Bonneville Power Administration
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SUBJECT: The Dalles Dam Spillwall Construction and Bonneville Dam downstream
Chum Spawning

DATE: November 3, 2008

1. On October 21, 2008, the Fish Managers submitted a Joint Technical Staff Memo (JTSM) to the Action Agencies regarding the construction of the spillwall at The Dalles Dam. In this JTSM, the Fish Managers requested that the Corps and BPA provide them with a plan for hydrosystem operation during this construction to provide chum spawning conditions below Bonneville Dam.
2. Corps projects are operated to meet a variety of Congressionally authorized project purposes such as flood control, power generation, irrigation, recreation, navigation, water supply (municipal, industrial, and agricultural), and fish and wildlife. As such, the Corps must consider all of these authorized purposes when making operational decisions.
3. The spillwall at The Dalles Dam is being constructed by the Corps in accordance with the 2008 BiOp regarding structural improvements to help achieve juvenile survival performance standards. Fish survival studies at The Dalles indicate that more direct conveyance from the spillway to the river's thalweg (deepest part of the channel) would likely improve dam passage survival rates for juvenile salmonids. The construction is being completed in two 6-month phases: Oct 2008 – March 2009 and October 2009 – March 2010, and is expected to be fully operational for the 2010 fish passage season.
4. To complete construction of the spillwall, sufficiently high water surface elevations are necessary to meet the draft requirements of the contractor's derrick barges in order for them to operate over the shallow rock shelf that exists in the construction area. To meet this requirement during the month of October, the Corps committed to operating the Bonneville forebay between 75.0 and 76.5 feet as a hard constraint. These Bonneville forebay elevations resulted in tailwater elevations at The Dalles of 76.0 feet or higher. After further examination of the river conditions and grounding clearances for the actual equipment the contractor has on-site, and the implementation of shallower draft barges by the contractor it has been determined that the minimum tailwater elevation requirement in the construction area is 75.5 feet for normal day-to-day construction activities. Therefore, provided that there are sufficient outflows can be achieved from The Dalles Dam, the Bonneville forebay may be operated at lower elevations while providing sufficient depth for construction activities in The Dalles

tailwater. In addition, there will be special operations necessary to transit a deep-draft derrick barge to and from the stilling basin over the shallower areas of the rock shelf. These special operations will require tailwater elevations at The Dalles of 77.0 feet for 4 to 6 hours at a time. This operation is expected to occur twice a week from October through March. During heavy “picks” (when lifting large pre-cast concrete cells) a 78 foot tailwater elevation below The Dalles Dam may be required. A total of about 7 of these heavy picks will be required during this years’ construction with the first likely to occur in mid-December depending on the contractors’ progress. These higher tailwater elevations at the construction area can be accomplished through a combination of Bonneville forebay elevations and outflows at The Dalles.

5. Fall operations for chum under normal circumstances are challenging due to a variety of factors, including tidal fluctuations and local precipitation, which necessitate widely varying discharges to maintain the desired daytime elevation below Bonneville for chum spawning during November and December. During fall chum spawning, the Bonneville tailwater elevation is typically managed to a target elevation of 11.5 feet, with a range of 11.3 to 11.7 feet, in order to provide access to adequate spawning habitat. Typically during winter, the Bonneville forebay elevations have been operated within a 5-foot range (71.5 to 76.5 feet) that allows for a daily 4.0-foot operational limit at the Stevenson gaging station. This 5.0-foot operating range/4.0-foot daily change limit has historically allowed for power flexibility as well as optimization of spawning conditions below Bonneville Dam. Last fall for instance, the range of flows at Bonneville to provide an 11.5 foot tailwater elevation ranged from 80-130 kcfs. Further complicating the management of this varying requirement are uncertainties in local and upstream incremental inflows and nonfederal project operation, which can cause large amounts of variability in the daily volume of water passing through Lower Columbia projects.
6. Once spawning is complete, Bonneville tailwater elevation is managed to maintain an agreed upon minimum elevation where redds were formed in order to provide proper incubation conditions through emergence while considering the probability of achieving the spring refill objectives upstream. Also, if higher flows are required to maintain the agreed minimum elevation throughout incubation and emergence, it may be necessary to draft Grand Coulee, which could jeopardize the ability to achieve the spring refill objective at Grand Coulee.
7. In anticipation of the construction of The Dalles Dam spillwall, the Action Agencies have considered a wide variety of factors that may influence reservoir operations during construction activities. Chum operations are a primary consideration as is operating in accordance with the other provisions of the 2008 BiOp specifications (including the spillwall construction). In order to provide chum with adequate access to spawning habitat and the conditions necessary to complete the spillwall construction as scheduled, the Corps has examined the maximum flexibility in reservoir operations to meet all responsibilities. Paragraph 4 above describes the maximum flexibility for the Bonneville pool. Normal operating ranges of projects upstream of Bonneville are: (1) The Dalles, 3 feet (157-160 feet); and (2) John Day,

normal operating range of 2.5 feet (262.5 to 265 feet). Additional flexibility in the John Day pool may be available depending on prevailing river conditions, navigation requirements, water supply needs, and flood control requirements. In addition, the spillwall contractor is examining all possible strategies to minimize the restrictions placed on the Bonneville pool elevation.

8. The Action Agencies are committed to operating the system to the specified chum spawning tailwater elevations, recognizing there are additional constraints needed to continue safe conditions for the spillwall construction, while also providing for other project purposes. Consequently, operations for The Dalles tailrace construction work will likely contribute to less stable daylight Bonneville tailwater elevations. Based on the aforementioned system considerations, and in close coordination with TMT, the Action Agencies propose the following plan:
 - a. Begin operating for chum below Bonneville Dam on 7 November 2008 at 0600 hours for a Bonneville tailwater range of 11.3 to 11.7 feet.
 - b. Spillwall contractor will modify operations to include the following:
 - Mobilize a shallow draft 125-ton service crane to the site to service all work on the shallow rock shelf.
 - Mobilize a shallow draft tug, and possibly a second, to the site.
 - Mobilize a shallow draft barge to the site for transporting the heavy pre-cast concrete units that make up the spillwall.
 - Limit the use of the two large derrick barges (DB LA, 300 tons; DB Alameda, 100 tons) to the deeper stilling basin except when sections are being placed.
 - Re-ballast and reconfigure the DB LA to draw a more shallow draft during the rock shelf transit operations.
 - c. Real-time data from a tailwater gage installed in the work area at The Dalles Dam (Bay 23) will be transmitted to the Corps and shared with the BPA to give more accurate data for the spillwall construction area. This gage will provide more accurate depth information regarding the actual surface water elevations at the construction site. The tailwater gage data currently being transmitted to the Corps and BPA is downstream of the powerhouse.
 - d. For the October 2008 – March 2009 construction phase, the Action Agencies will operate the system to provide the necessary minimum tailwater elevation at The Dalles to accommodate spillwall construction 24 hours per day, 7 days per week (75.5 feet). This operation could result in the Bonneville Dam forebay operating within a larger operating range than specified in Paragraph 4, but no higher than 76.5 feet (see section 9(j) for exception). Work plans for the October 2009 – March 2010 spillwall construction phase are currently being developed.

- e. If river flows allow, meet both the Bonneville tailwater elevation target and The Dalles tailwater elevation target for construction work. River flows from Bonneville in excess of those required to maintain the specified tailwater elevation below Bonneville will be shaped into the nighttime hours whenever possible to minimize any disruption of chum spawning activity.
- f. If river flows are high such that Bonneville and The Dalles tailwater elevations cannot be met, maintain an 11.3- to 11.7-foot Bonneville tailwater until the forebay approaches full (76.5 feet); then, depending on conditions, fill to 76.5 feet or increase outflows. Pulsing operations or establishing a higher protection elevation will be coordinated at TMT as needed.
- g. During November and December the hydrosystem will be managed as close as possible to provide the expected flows required to meet the 11.5 tailwater at Bonneville Dam. The lack of lower Columbia storage to absorb the uncertainties noted above may result in more daylight tailwater fluctuations below Bonneville. Lake Roosevelt will likely draft in November, then begin filling sometime in December, which may result in further operational challenges if December flows at Bonneville are higher than November.
- h. After November 9th, if necessary to maintain Bonneville tailrace conditions for chum spawning, the Corps will consider operating John Day Dam forebay between 261.0 feet to 265 feet. This will assist in managing daily fluctuations in lower Columbia inflow. It may be necessary to raise the minimum elevation in the event that the Irrigon/Umatilla hatcheries notice problems regarding their water supply. It may also be necessary to operate below 261.0 feet temporarily if needed during major flood events to meet flood control requirements. On March 1st the minimum elevation will be 262.5 feet to meet irrigation needs, unless the pool needs to be drafted temporarily for a flood event. The pool will be operated at this elevation until November 9th, 2009.
- i. If necessary, the Corps will consider requesting a flood control variance to fill John Day pool to 266 feet for short durations during the time when chum are spawning (November/December).
- j. Operate Bonneville Dam forebay to as high as 77.0 feet up to 18 times per year, as allowed per the approved Water Control Manual, to provide for additional lower river flexibility to achieve the Bonneville tailwater elevation specified in the 2008 BiOp for chum spawning.